IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Lester F. LUDWIG Serial No.: 10/676,249 Filed: September 30, 2003 For: MULTI-CHANNEL SIGNAL PROCESSING FOR MULTI-CHANNEL MUSICAL INSTRUMENTS	Art Unit: 2837 Examiner: Marlon T. FLETCHER Conf. No.: 6374

REPLY BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

This reply brief is submitted responsive to the Examiner Answer filed January 26, 2010. The filing of this Reply Brief is timely, the time for response being March 26, 2010. Accordingly, appellant submits the following:

1. Overview

Appellant has carefully reviewed the various points set forth in the Examiner's Answer and submits that there remain a number of clear errors in the Examiner's rejections for which the appellant seeks review by the Board. Appellant will now address the various points raised by the Examiner.

2. Preliminary Comments

The appellant wishes to advise the Board of Patent Appeals and Interferences that application 09/812,400 has a decision rendered by the Board on November 13, 2009 in favor of the appellant. This application is a parent application to the instant application, and was before the same examiner.

3. Background

At issue for each of independent claims 1, 23, 45, 62 is whether Hasebe teaches processing a plurality of incoming audio signals by variably changing one of pitch, timbre, or timing of each signal. At issue for independent claims 79 and 91 is whether Hasebe teaches processing a plurality of incoming audio signals by variably changing the pitch of each signals. .

The Examiner attacks all of the independent claims by arguing Hasebe teaches shifting of the pitch; however, Hasebe does not teach the shifting of pitch. Hasebe teaches a system for implementing two separate pitch detection processes, one of which may provide an incorrect measurement on the basis of where along the length of a guitar string the string is plucked. Hasebe's system uses a method for first determining where the string was plucked and then selecting what would then be the **correct** pitch measurement data. Hasebe uses the word "correct" as a adjective – i.e, the pitch measurement data provided by a given pitch detector is "correct" or "incorrect." The Examiner erroneously reads the

word "correct" as a verb and incorrectly maintains that Hasebe's system provides a **correction** to the pitch. In the Examiner's view, since the pitch is 'corrected' by Hasebe, the pitch must be changed, hence reading on the claims under appeal. The appellant believes it will be clear to the Board upon of (1) review Hasebe's system functionality and (2) exhaustive review of each use of the word "correct" by Hasebe that the Examiner's interpretation of "correct" as a verb and "correction of pitch" as a capability of Hasebe are inaccurate.

In more detail, the Examiner has incorrectly has relied upon Hasebe's pitch detectors (13, 15), control section (16), tone generation section (17), and signal processing section (19) to teach this limitation. (*See*, FIG. 3).

Hasebe's incoming audio signals (the signals from the pickups 2 and 3) are processed in two paths. The first path is the "analog" path which passes through the analog circuit 27. The second path (the "digital path") passes through the analog-to-digital converter 10, the signal processing section 19, and the digital-to-analog section 20. Both the analog path and the digital path converge at the mixer and selector 22 for final selection and mixing in the mixer and selector 22. FIG.3 showing each of the analog and the digital path is reproduced below for the convenience of the Board.

The pitch, timbre, or timing of incoming audio signal is not variably changed in the analog path. The analog circuit 27 includes analog devices, such as, for example, analog filters, an analog loudness controller, or an analog mixing circuit, but does not variable change the pitch, timbre, or timing of incoming audio signal. (*See*, col. 7: 9-17)

The pitch, timbre, or timing of incoming audio signal is not variably changed in the digital path. The signal processing section 19 **adds** effects to the audio signal, either to the individual tone signals or to groups of tone signals. The example of the effects added to the tone signals is

reverberation. (*See*, col. 6: 37-47). Reverberation adds persistence and ambience to an audio signal but does not alter the pitch of the signal. Hasebe does not provide any teaching that the frequency of the incoming audio signals is variably altered in the digital path.

Nothing in the analog or the digital path variably alters pitch, timbre, or timing of incoming audio signal.

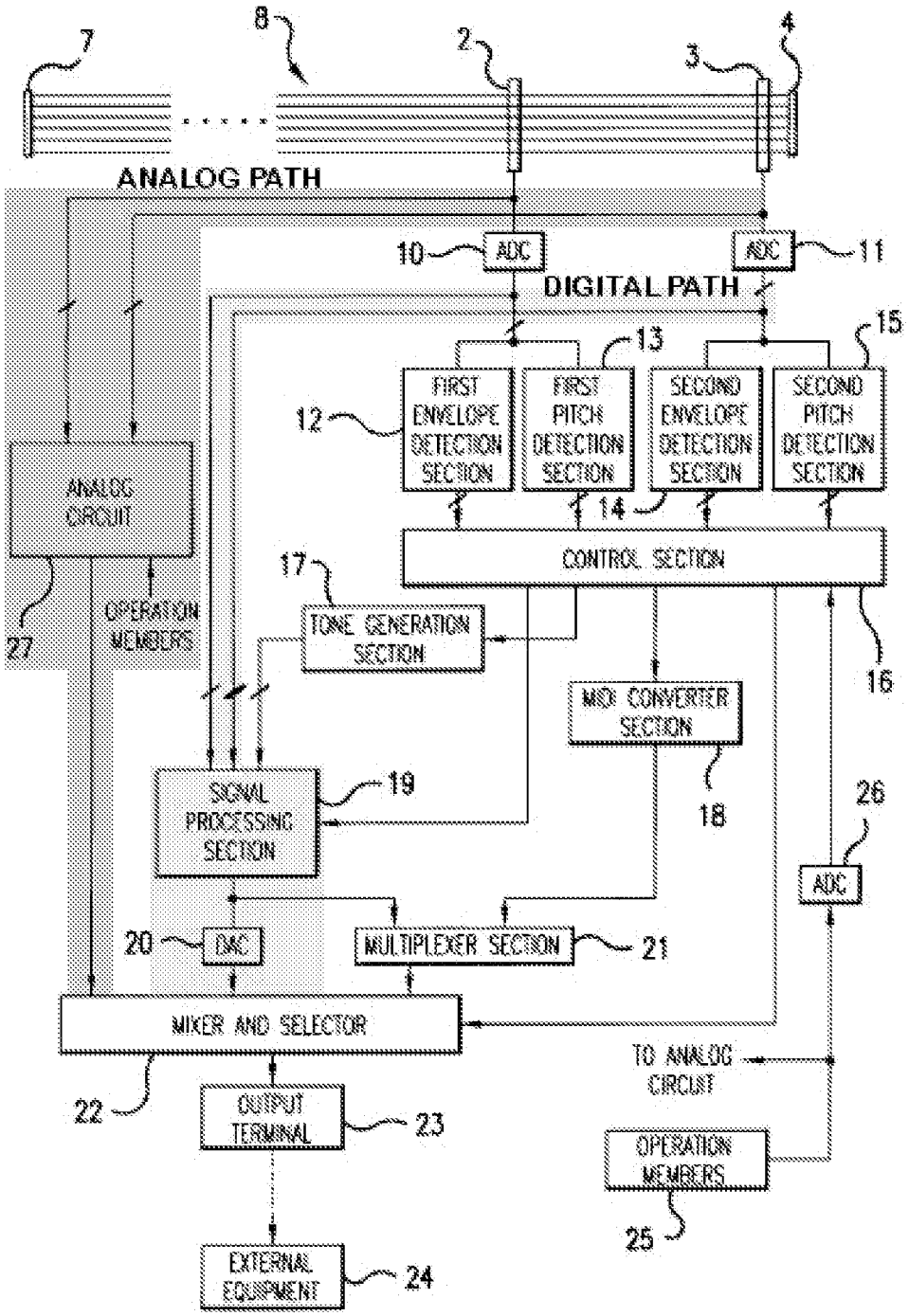

7
8
2
3
4
ANALOG PATH
10
ADC
ADC
11
DIGITAL PATH
13
15
12
FIRST ENVELOPE DETECTION SECTION
FIRST PITCH DETECTION SECTION
SECOND ENVELOPE DETECTION SECTION
SECOND PITCH DETECTION SECTION
14
ANALOG CIRCUIT
CONTROL SECTION
17
TONE GENERATION SECTION
27
OPERATION MEMBERS
16
MIDI CONVERTER SECTION
SIGNAL PROCESSING SECTION
19
18
26
ADC
20
DAC
MULTIPLEXER SECTION
21
MIXER AND SELECTOR
TO ANALOG CIRCUIT
22
OUTPUT TERMINAL
23
OPERATION MEMBERS
25
EXTERNAL EQUIPMENT
24

FIG.3

4. Examiner's Clarification

Section 10, Response to Argument, of the Examiner's Answer clarifies that the Examiner has the following positions:

A. Examiner states that Hasabe teaches "a plurality of signal processors ... wherein said processing ... is performed by variably changing one or more signal attributes ..., wherein said one or more signal attributes is selected from the group consisting of: pitch, timbre, or timing" by specifically referring to col. 4: 30 – 5:10 and 5: 40 – 6: 8 and stating "the pitch is detected and corrected (processed and varied)."

B. The Examiner states that providing control signals for adding various effects to audio signals is the same as processing an audio signal.

C. The Examiner states that processing an audio signal to vary an attribute of pitch, timbre, or timing is met by audio signals processed through elements 12-16 being provided to the tone generator 17.

Each of the Examiner's positions will be examined in turn.

5. Appellant's Responses to Examiner's Clarifications

As a preliminary matter, the Examiner has stated the appellant is arguing against Office Actions that are not the subject of this appeal. The appellant wishes to advise that the prior Office Actions are presented as a summary of the prosecution history as a convenience to the Examiner and the Board. Only the last Office Action is being argued.

A. The Examiner is incorrect when he states "the pitch is detected and corrected (processed and varied)" referring to col. 4: 30 – 5:10 and 5: 40 – 6: 8. The portions of Hasebe cited by the Examiner relate to selecting a "correct pitch detection" and then selecting a correct pitch data set, not to "correcting" a pitch of an audio signal. Hasebe only uses

"correct" as an adjective, not as a verb. (*See*, e.g. col. 5: 65-67, "The tone control section determines correct pitch data sets based on the corresponding first pitch data sets and second pitch data sets.") Nowhere does Hasebe discuss "correcting" the pitch of an audio signal, and the appellant is at a lost to understand how the portions of Hasebe cited by the Examiner teach varying the pitch of an audio signal.

B. The independent claims process an incoming audio signal to variably alter pitch, timbre, or timing. The Examiner states that providing control signals for control of the adding various effects to audio signals is the same as processing an audio signal.

The Examiner is equating providing control signals for adding audio effect is the equivalent of changing the frequency of an audio signal. (*See*, Examiner's Answer, p. 8.) The Examiner's logic must fail. A control signal for controlling the processing of an audio signal, even if derived from an audio signal, is not an audio signal.

Hasebe derives controls signal from the audio signals generated by the pick-ups in the first and second envelope detection sections (elements 12 and 14, FIG. 3). These control signals are used to determine the picking position which is passed to the tone control section 16. The picking position and pitch data form the first and the second pitch detection sections, elements 13 and 15, are used by the tone control section 16 to generate additional control signals passed to the tone generation section 17 and the signal processing section 19 for adding an audio effect to the audio signals. Please refer to FIG. 5. No audio signal is passed to the tone generation section 1, and a control signal is not an audio signal. Additionally, Hasebe does not teach that the tone signal generated by the tone generator is at a different pitch than that of the incoming audio signals. Therefore, the Examiner's statement that providing

a control signal equates to changing the pitch of an audio signal makes no sense in the context of Hasebe's disclosure.

Even if providing a control signal could somehow be construed as being the same as processing an audio signal, which the appellant fully asserts it is not, adding a reverberation effect is not the same as changing the pitch of an audio signal. As discussed *supra*, a reverberation adds persistence and ambience to an audio signal but leaves the underlying pitch of the tone unchanged. When the underlying tone is unchanged, there is no change in the pitch. Therefore, adding reverberation to a tone does not change the pitch of the tone, and at least for this additional reason, the Examiner is incorrect when he states that providing control signals for adding various effects to audio signals is the same as processing an audio signal.

Additionally, the appellant notes that although independent claims 1, 23, 45, 62 also provide for change of timbre, each of these claims additionally requires the change to be done variably. Nowhere does Hasebe teach or reasonably suggest that the reverberation effect or any other effect is variably changed as is required by the claims.

C. The Examiner incorrectly states that processing an audio signal to vary its pitch is met by audio signals processed through elements 12-16 being provided to the tone generator 17. Hasebe states (col. 9: 54-55) that **control data** is supplied to the tone generation section 17. No audio signal is supplied to the tone generation section 17, *see* FIG. 5.

The signals from the pick-up devices 2 and 3 lose all the attributes as audio signals when processed by the envelope detection and pitch detection sections 12-15. The envelope detection sections 12 and 14 supply note-on signals to the control section 16. A note-on signal is, for example, an event control signal supported by the MIDI 1.0 standard and is

the signal that may initiate a tone. Here, Hasebe uses a note-on signal as a strobe to a latch (col. 8: 62-63). A person of ordinary skill in the art would recognize that a control signal derived from an audio signal is a control signal, not an audio signal. The Hasebe control signals carry no information to reproduce an audio tone, and cannot be considered an audio signal.

The tone generation section 17 also receives pitch data from the pitch detection sections 13 and 15. Pitch data are derived from the audio signals from the pick-up devices, but are control signals used by the tone generation section to reproduce a tone. Even though Hasebe may detect pitch data represented in the incoming audio signal, the pitch data sets are not audio signals but only data used to produce a new audio tone. As mentioned above, the new audio tone is not taught by Hasebe as being at a pitch different than that of the pitch of the incoming audio signals. No change of pitch is realized by the Hasebe system.

Therefore, the Examiner is incorrect in stating that processing an audio signal to vary its pitch is met by audio signals processed through elements 12-16 being provided to the tone generator 17.

For at least these reasons, the Examiner errs when he states Hasebe teaches "processing an incoming audio signal ... changing one of pitch ...."

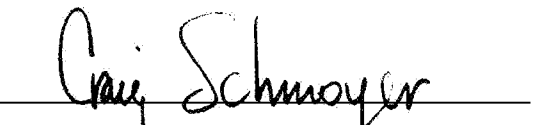
6. Claims currently in condition for allowance

As set forth in MPEP 2131, to anticipate a claim, the reference must teach every element of the claim. Since, as discussed above, every element of independent claims 1, 23, 45, 62, 79, and 91 is not taught by Hasebe, appellant submits that these claims are not anticipated by Hasebe and are therefore patentable. Additionally, claims 2-22, 24-44, 46-61, 63-78, and 92-102 are patentable at least by virtue of dependence upon a patentable independent claim.

Appellant has demonstrated a number of errors in the rejections of independent claims 1, 23, 45, 62, 79, and 91 and that claims 1, 23, 45, 62, 79, and 91 are patentable. Dependent claims 2-22, 24-44, 46-61, 63-78, and 92-102 are patentable as well by virtue of dependence on a patentable independent claim. Appellant therefore submits that the identified rejections are improper and that the identified claims are allowable over the asserted references. Appellant respectfully requests that the Board of Patent Appeals and Interferences reverse the decision rejecting the identified claims and direct the Examiner to pass the case to issue.

Respectfully submitted,

Date: March 26, 2010

By: 

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